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elaborate series of maps is presented showing the geographical distribution of substantially every species of farm property and product.

The more detailed information is published in two volumes made up of state bulletins. These volumes are very usable. The state is accurately described as to soil; the leading statistics are presented in a series of small state tables accompanied by suitable text; detailed statistics are given by counties. So far as possible comparative figures from preceding censuses are given in the state tables. All in all it will be less frequently necessary to turn from one census report to another in making comparisons than has heretofore been the case.

A unique feature of the publications is the combining of each of the state bulletins with the Statistical Abstract of the whole census for use in the respective states. This gives to a great number of people all the information desired and saves sending out the complete volumes where this combination serves the purpose as well or better.

Statistics according to age of farmer; much information concerning rented farms; and the same for mortgaged farms are three items of importance on which the census bureau still has the unpublished facts. These are facts which should be made available, no doubt they will be, but the longer they are in appearing the less will be their value.

It is to be hoped that a more satisfactory and less expensive method of gathering agricultural statistics may be devised. Making use of the rural mail carriers has been suggested, and the suggestion merits consideration. It may be found feasible to specialize, as it were, with respect to inquiries made at a given time, putting the emphasis on one subject at one census and on something different at another. There is good reason to believe that our agricultural census figures are reasonably reliable. What is needed is greater facility in gathering them, and much greater speed in preparing them for use.

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THIRTEENTH CENSUS OF THE UNITED STATES—MANUFACTURES, 1910.

Volumes VIII, IX, X, Census Office, Washington, D. C.

The statistics of Manufacturers for the Thirteenth Census of the United States constitute three of the twelve volumes (including the Abstract) of the Report. Volume VIII is entitled "General Report and Analysis"; Volume IX, "Reports by States, with Statistics for Principal Cities"; and Volume X, "Reports for Principal Industries." Volumes IX and X contain essentially the same data that are found in Volume VIII, but treated in more detail, and arranged either primarily by states and cities, or by industries.

The data presented were collected for the most part by special agents appointed for that purpose. In remote districts the population enumerators either aided in the collection or completely collected the data asked for on the General Schedule. The questions asked relate to a few fundamental facts. All "establishments" returned the General Schedule, while in the case of some sixty-two industries, special or supplementary questionaires were used.

For the most part, the questions asked in this Census are comparable to those asked in the 1900 Regular Census, and in the Special Census of 1904. The 1909 Census, like that of 1904, was "confined to manufacturing establishments conducted under what is known as the factory system, exclusive of the so-called neighborhood, household, and hand industries." The Twelfth (1900), and preceding censuses were not so restricted, but in the Report under discussion the statistics for 1899 (1900 Census) were revised so as to exclude the establishments which would not have been canvassed under the instructions for the later censuses.

In two important respects the scope of the Census of 1909 differed from that of the Census of 1904. In 1909, reports were secured for all flour and feed mills, grist mills, and saw mills (omitting those with products valued at less than five hundred dollars in 1909), including even those grinding or sawing for a fixed charge, and not owning the materials and products. The latter—the "custom mills"—were not canvassed in 1904. The Census of 1909 also included statistics of steam laundries.

In 1904, 339 industrial groupings were used; in 1909, 264—a reduction of 75 industrial classes having been effected. In each case the governing condition in industrial grouping is the "product of chief value" (Vol. VIII, p. 37), but by this means too great emphasis is given to some industries, and not enough to others, when a certain product is put out as a by-product, but the industry producing it is classified otherwise because of the main product. Industry totals do not, therefore, give an accurate index of the relative importance of the industries. Changes in the relative amount of various products, and their values, make it necessary to classify establishments differently at different censuses, and thus impair strict comparability. The dangers and problems accompanying this phase of the subject are adequately treated in Volume VIII, pages 37 to 39, while the complete industrial classifications and the changes made in them in 1909, as contrasted with 1904, are given in full in Appendix D, pages 819 to 832, of the same volume.

In no prior census have we been furnished with the figures of "Value Added to Materials by Manufacture." It is evident that no manufacturing establishment, as such, produces the "whole of any commodity." The materials used come to it from various sources, and in all stages of manufacture. The only method, maintains the Census, of measuring the economic importance of the manufacturing process, is by determining the added utility, or money value, of the materials transformed in the process. The value is "in most cases, substantially the difference between the cost of the materials and the value of the products" (Vol. VIII, p. 23), and the statistics shown are, "in each case," this difference. Such figures are "particularly valuable because they are almost entirely free from the duplication that appears in the total value of products" (Vol. VIII, p. 23). The duplication possible is with "contract work," and constitutes 2.1 per cent. of the value added by manufacture (Vol. VIII, p. 24).

A new inquiry, specified in the Census law, is the number of stockholders. Provision is made for this fact in question 1, but the data collected are not published, and justly so, since number has no significance without the amount and character of the respective holdings. Such inquiries, of course, have no place in a general manufacturing census.

As contrasted with the Census of 1904 and 1899, which sought to ascertain the number of persons employed at different rates of pay, and to segregate the amounts paid to men, women, and children employed as wage-earners, the Census of 1909 asked merely for the aggregate amount paid to each of the following classes: salaried officers of corporations; superintendents and managers; clerks, stenographers, salesmen, and other salaried employees; and wage-earners, including pieceworkers. Fortunately we are relieved in this Census from having computed for us, and injected into the discussion, all references to an average wage.

The inquiry relating to number of persons engaged in manufacturing industries was simplified in the 1909 census. Sex composition was required for salaried employees, and sex and age—sixteen years of age and over, and under sixteen—for wage-earners, including pieceworkers. The numbers, in both cases, were to be reported as per pay-roll on the fifteenth day of December, 1909, or the nearest available date. In 1904, the greatest and least numbers employed at any time during the year, by sex and age—men and women separately, sixteen years of age and over, and children under sixteen years without respect to sex composition—were required. Moreover, the schedule called for the average number by months, and by sex and age. Briefly, the difference is between those actually employed on a certain date, as taken from the pay-roll, and the greatest and least number employed at any time by sex and age, distinction being made by sex for those under sixteen years of age, in 1909. In 1909, the actual number of wage-earners on the fifteenth day of each month, as per pay-roll, without respect to sex or age, is required, while in 1904 the question called for the average number of wage-earners employed during each month, classified by sex and age. In spite of these differences, "It is believed . . . that the figures for three censuses (1909, 1904, 1899) are substantially comparable in a great majority of the cases" (Vol. VIII, p. 276). Especially is this held to be true when the statistics relate to large numbers, as for example, to industries as a whole, or to state totals.

The sex and age composition of the wage-earners by months for the 1909 Census is computed as follows, from the sex and age composition for December 15, 1909: " . . . The per cent. distribution by sex and age of the wage-earners in each industry for December 15, or the nearest representative day, has been calculated from the actual numbers reported for that day. This percentage has been applied for the average number of all wage-earners for the year in that industry, and thus an estimate of the average number of men, women, and children employed during the year has been obtained. These calculated averages for the several industries in each state have been added to give the average distribution for the state as a whole, and the sum of these averages for the several states has been used to determine the sex and age distribution of persons engaged in manufacturing industries for the country as a whole" (Vol. VIII, p. 238).

The average number employed during the year is interpreted to mean the number that it would be necessary to employ throughout the whole year to turn out the value of product actually produced. Accordingly the wage-earners reported for each month are added together and the sum divided by twelve. In this respect the statistical methods for 1904 and 1909 are comparable.

In summary, the facts for each establishment available for presentation relate to location and character of organization, time in operation, capital employed, persons employed, both salaried and wage-paid, materials used, miscellaneous expenses, value of product, power employed, and fuel used. There is almost no limit to which the facts recorded under these various captions, for a country as large as ours and with such diversified industries, can be classified. Obviously, however, intricacy and detail of presentation can only be justified statistically when the data are either fairly accurate or typical, or are affected by errors which tend to compensate each other. Political considerations may prompt intensive allocation of capital employed, wages paid, value of product created, etc., by political jurisdictions, by industries, by size of establishments measured by various standards, but the query must always remain to one who has serious interest in the use of such data and an appreciation of their limitations, as to the propriety of this refinement, from the points of view of both cost and purpose. "Capital employed" is a dangerous statistical unit, both for absolute and comparative purposes, even when carefully measured; gratuitously furnished, with little or no opportunity for verification even within the widest margins, save those which are evident on the face of the census returns, its tabulation in detail is without statistical warrant. No one is more convinced of the limitations of this unit than the Census office, yet seemingly because of political necessity, not only is the capital employed required to be reported, but it is tabulated in the greatest detail, made a cardinal factor in industrial ranking, at the same time that there is printed page after page of conclusive and unmistakable declarations that it is not relatively or absolutely worth the paper upon which it is printed. The Census office, in text analysis, never loses an opportunity to counsel against any weight being assigned to the concept. The only regret is that each column where it appears is not marked with an asterisk, and the following note appended: "These data are meaningless: They are collected and printed only because the law requires it." Consistency as between text and statistical tables would demand some such insertion.

The same considerations, and with equal force, apply to data on "Value of Product." The figures printed have little if any statistical worth, either for one industry or for combined industries. The duplications of value are frequently and unmistakably pointed out by the Census office, and cautions against the use of the data in any definite or specific sense are found throughout the Reports under review. In spite of this fact, by legislative mandate, the data are collected, and, seemingly, by political necessity, the totals in divided, subdivided, and dissected form are strewn throughout almost every page, giving the value of product to the nearest dollar, for instance, for combs and hairpins (Vol. VIII, p. 485), hones and whetstones, in Indiana (Vol. VIII, p. 721), etc. The data are elaborately tabulated by states by industries (Vol. VIII, General Table VI), by industries by states (Vol. VIII, General Table V), by summaries for states (Vol. VIII, General Table IV), etc., etc. From a statistical viewpoint this is hardly less than farcical.

Moreover, considerable importance is ascribed by the Census to the unit "Value Added by Manufacture," since the amount of duplication as between establishments and industries is largely eliminated. And yet this item is computed as the difference between the value of the product and the cost of materials used, against the use of which justified warnings are constantly urged. It is not clear how such sanctity may characterize the offspring of such contaminated parents. We do not have a condition here where error tends to correct itself, but rather where it becomes cumulative. Neither is this a case where an essentially correct idea may follow from data in and of themselves misleading. Neither of these statistical truths control. The regrettable thing is that legislative injunction requires the collection of this type of data, and that political pressure seems to demand their detailed tabulation. What is said respecting capital, value of product, and cost of material, is directed against the method and circumstances of collection, rather than against the desirability of the data if correctly determined. Such statistics *per se* would be harmless if they were used understandingly. Unfortunately they are not, and the cautions strewn throughout the text—which only the discriminating see—do not avail to prevent false conclusions from being drawn from them. Pressure of time, lack of money, the method of collection, and the uses to which they are put, all combine to make the wisdom of their publication highly questionable. So long as the law requires their collection, it might be argued that their possession justifies publication. Such conclusion does not necessarily follow— at any rate, publication in the present form. Our criticism is directed both to the collection and elaborate tabulation of meaningless and, for all scientific purposes, useless data. If the legislature will not relieve us from collecting them, the limited discretion given the Census office in the matter of publication should be directed toward lessening the necessary evil of detailed publication.

Much the same line of criticism might be extended to the captions, "Cost of Materials," and "Power Used." The space allowed for this review will not permit of an extended treatment of these items.

As for the other inquiries, they primarily relate to matters which may be enumerated, and in which the motives to under—or over—evaluate, or to wilfully misstate, are not controlling. Difficult as is the formulation of a definition of an "establishment," the basis for classification is in the discretion of the Census office, and the lack of comparability may be reduced to a minimum.

Collection of data on wages and salaries paid does not offer insurmountable obstacles. The Census office undoubtedly has acted wisely in protesting against the use of wages paid to measure the proportion of value of product which goes to this factor, and against the practice of making direct or indirect comparisons of the relative amounts paid in wages and in salaries.

Likewise respecting the number of salaried employees and wage-earners, the chances for misleading facts in this census are reduced to a minimum The data are taken from the pay-rolls, and applied to a certain day of the month. The industries in which the facts reported for this month are not typical are comparatively self-evident, and errors through comparison or by absolute statement are not likely to be serious.

The table of contents outlines each chapter fully, the character of the matter being indicated by such headings as "Introduction," "Summary," "Principal Tables," "Diagrams." Following the fifteenth chapter are six so-called General Tables (pages 507–793) and following this, four Appendices (pages 797–832). The volume also contains an elaborate "Index to Industries, by Chapters and by General Tables."

Of the Introduction, Chapter I, nothing needs to be said, save that there is here reproduced, in summary, the essential cautions and instructions issued with the schedules, with the Instructions to Special Agents, and with the Instructions for Editing and Revising the Schedule, as well as the salient points in which the 1909 schedules differ from and agree with those of the censuses immediately preceding it.

From the reviewer's viewpoint one of the chapters in Volume VIII, against which the most vigorous protest should be directed, is Chapter IV—Summary by States and Geographic Divisions. In this chapter the various states are ranked according to criteria furnished by data on the schedules—value of products, wage-earners, and value added by manufacture, being the controlling items. In Table 4, page 61, the ranking is according to amount and percentage of increase in value of products from 1899 to 1909; in Table 5, page 62, the states are grouped by value of products; in Table 7, pages 66–69, the states are ranked according to first, second, and third place, by industries (264); in Table 10, pages 70–76, the industries of the various states are ranked first, second, and third, as measured by value of products, etc.

Such a ranking process is indefensible for at least two good reasons, if for no others. First, the criteria upon which the ranking is made are for the most part meaningless or unreliable or both; and second, the form of ranking is without statistical merit. Concerning the former, sufficient has been said above; the unreliability of the latter may conclusively be shown by a single example taken from the Report under consideration. The following tabular statement compiled from Volume VIII, Tables 1 and 2, pages 40–43, and 45-47 respectively, is designed to show for two criteria for ten industries the unreliability of ranking by numerals.

NAME OF INDUSTRIES AND RANKING BY VALUE OF PRODUCT, AND VALUE ADDED BY MANUFACTURER, 1909.

Industry	Value of Product, 1909.				
	Amount.	Rank of Industry.	Difference.		
			Amount.	Per Cent.	Rank.
Leather tanned, curried and finished....	$327,874,187	18			
Butter, cheese, and condensed milk....	274,557,718	19	$53,316,469	19.42	1
Paper and wood pulp................	267,656,964	20	6,900,754	2.58	1
Automobiles, including bodies and parts	249,202,075	21	18,454,889	7.40	1
Smelting and refining lead............	167,405,650	30	81,796,425	48.86	9
	Value added by Manufacture, 1909.				
Boxes, cigar........................	$4,178,038	164			
Soda water apparatus................	4,113,059	165	64,979	1.58	1
Files................................	4,095,473	166	17,586	.43	1
Emery and other abrasive wheels......	4,059,351	167	36,122	.89	1
Baskets, rattan, and willow ware......	3,359,948	176	699,403	20.82	9

For value of product, in the instances chosen, a change in rank of 1 is shown to result from an absolute difference, varying from approximately seven millions to fifty-three and one third millions of dollars, or relatively, by a difference ranging from 2.58 per cent. to 19.42 per cent. In one instance a change in rank of 1 requires five eighths as large an amount as is necessary in another case to occasion a change in rank of 9. Similar, although not so startling differences—simply because the items chosen were taken from the upper end of the scale—assigned to the uniform unit—the passage from one to another position in the numerical scale—appear for the other criterion, value added by manufacture. Ranking of states or of industries in such a numerical hierarchy is done only in violation of the elementary truths of statistical methods. What justification, other than political, there is for elaborate ranking of states numerically is far from clear. The same method of stating relative standing is repeated at various other places throughout the three volumes, and unfortunately in many places the numerical positions are restated at considerable length in the text.

A reading of Chapter VIII, Volume VIII, devoted to Expenses, leaves one skeptical of the real worth of the statistics collected under this caption. The figures suffer because of lack of comparability with those of former censuses, and we are constantly advised of their serious limitations when taken absolutely. The treatment of both text and tables, devoted to this subject, is restricted to five and one half pages, and is characterized by the lack of any positive comment as to the real value of the statistics included.

It is unnecessary, and probably out of place, in this review, to comment in detail on the topics treated and the method of treatment in the remaining chapters of this volume. The details relate to character of ownership, size of establishment, persons engaged in manufacturing industries, etc.

Chapter XV is devoted to a "Description of Individual Industries with Principal Statistics for Each," under fourteen headings, namely: Food and Kindred Products, Textiles, Iron and Steel Products, Lumber and its Remanufactures, Leather and its Finished Products, Paper and Printing, Liquor and Beverages, Chemicals and Allied Products, Stone, Clay and Glass Products, Metal and Metal Products other than Iron and Steel, Tobacco Manufacturers, Vehicles for Land Transportation, Railroad Repair Shops, Miscellaneous. In this chapter are given in broad outline the salient facts given in detail in Volume X.

Volume IX comprises a collection of Bulletins previously issued for the various States and Territories. It contains three and one half pages of "Introduction and Definition of Terms" and a treatment for each state under the following general headings: Comparative Summary for 1909, 1904, 1899, by Industries; Detailed Statement for the State by Industries, 1909; Detailed Statement for Cities, 1909. Slight deviations from this general form are made for the District of Columbia, Alaska, Hawaii, and Porto Rico. The data presented are taken from the general schedule for the most part.

Volume X pertains to the principal industries of the country, and is made up of Bulletins separately published. Statistics relating to character of materials used and products manufactured are given in great detail. No especial comment is necessary in addition to those comments made above relative to some of the classes of data collected and published, save that in many respects the suggestions would, in the case of this volume, be emphasized even more strongly.

As to the execution of the work from the standpoint of arrangement of tables, clarity in text analysis, and definiteness in table headings, etc., the Census office is to be commended. These three sturdy volumes are evidences—a little belated, according to a recent critic—of what can be accomplished in the collection, classification, and presentation of a great mass of statistical data. The mere ease with which comparisons can be made may in a certain sense help to explain what we are inclined to look upon as undue refinement in methods of presentation.

A few suggestions on technique may be hazarded. Text and footnote references are almost invariably made by table number only. This is hardly adequate when the tables are distinguished only by Roman and Arabic symbols. The insertion of page references generally would have facilitated the use of the Reports; and the appending of both page and column references to tables, in the reviewer's estimation, would have been a worthy innovation. An enormous saving of expense would have been effected by the expression of all items merely to the nearest thousands. This would in no wise have detracted from the purpose of the figures. Consistency seems to have been sacrificed in the refining process, which required figures—in many respects, and for many inquiries, hardly more than estimates—to be expressed to the nearest dollar in all tables. The three volumes under review are conspicuous for the absence of maps and display of all kinds. The maps which are used are those of the "dot" type, the amount to be expressed being represented by the number and shading of dots. The merits of such a display over that of shading and cross-hatching are not clear. A feature of decided merit would have been the inclusion of a map at the beginning of each volume, on which were indicated the geographical divisions treated, such as Middle Atlantic, East North Central, etc. The divisions are not easily held in mind, and the summary by divisions would have been clearer if such a map had been appended for reference purposes.

The "Census statistics of manufactures are compiled primarily for the purpose of showing the absolute and relative magnitude of the different branches of industry covered, and their growth or decline" (Vol. IX, p. 9). So far as magnitude is reflected by data which primarily involve enumeration the Reports are not without considerable value. For inquiries involving evaluation the Reports do little more, either absolutely or relatively, than to indicate in the most general way the magnitude, growth, or decline of industry. The inclusion of inquiries involving evaluation may politically be necessary: tabulation in detail of the data received is warranted by neither administrative urgency nor statistical merit.

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THE CENSUS OF MINES AND QUARRIES FOR 1909.

The Census of Mines and Quarries for 1909, which was prepared under the immediate supervision of Isaac A. Hourwich and under the general management of Directors E. Dana Durand and Wm. J. Harris, is a much smaller volume than its predecessor, the Census of 1902, the number of pages having been reduced from 1,151 to 369. The reduction in the size of the volume is not accompanied by a corresponding reduction in the quantity of statistics furnished, but is due to the elimination of a large amount of the interesting descriptive material contained in the preceding census. Since changes in mines and methods have not been very striking, it was doubtless unnecessary to revise most of this part of the work and the present volume admirably answers the purpose of bringing forward seven years the figures of 1902.

The recent census follows the plan of the preceding enumeration as regards the principal outline. A new feature, however, is the classification of operators into those doing manual labor in their mines and those not so participating. This is certainly a useful distinction, for the millionaire coal baron has little in common with the operator of an insignificant drift producing a few tons a month for neighborhood use. This census continues the established plan of separating salaried employees from wage-earners. The studies of capital invested, primary horsepower, and expenses of production resemble, in most respects, those made by the last census. However, certain omissions of importance should be noted: The new census fails to give any data concerning capitalization and interest